Zootaxa 563: 1–10 (2004)
www.mapress.com/zootaxa/

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)
563

Microcambeva ribeirae sp. n. (Teleostei: Siluriformes: Trichomycteridae): a new sarcoglanidine catfish from the Rio Ribeira do Iguape basin, southeastern Brazil

WILSON J.E.M. COSTA*, SÉRGIO M.Q. LIMA* & CARLOS ROBERTO S.F. BIZERRIL**

** Laboratório de Ictiologia Geral e Aplicada, Departamento de Zoologia, Universidade Federal do Rio de Janeiro, Caixa Postal 68049, CEP 21944-970, Rio de Janeiro, Brasil. wcosta@acd.ufrj.br*
** * Laboratório de Avaliação Ambiental, Universidade do Rio de Janeiro, Voluntários da Pátria 107, CEP 22270-000, Rio de Janeiro, RJ, Brasil. bizerril@nitnet.com.br*

Abstract

A second species of *Microcambeva*, *M. ribeirae*, is described from the Rio Ribeira do Iguape basin, São Paulo, southeastern Brazil, which constitutes the southernmost record for sarcoglanidine catfishes. It is distinguished from *M. barbata* by a series of morphological features, including nasal barbel extent, position of the eye, first pectoral-fin ray extent, position of the anal fin, position of the posterior pore of the supraorbital canal, frontal shape, cranial fontanel extent, lateral process of the sphenotic, absence of the anterior ossification of palatine, and size of the posterior process of the palatine and supraorbital bone.

Keywords: Catfish, Siluriformes, Trichomycteridae, Neotropica, systematics, taxonomy, new species

Resumo

Uma segunda espécie de *Microcambeva*, *M. ribeirae*, é descrita da bacia do rio Ribeira do Iguape, São Paulo, sudeste do Brasil, constituindo o registro mais ao sul para bagres sarcoglanidíneos. Ela se distingue de *M. barbata* por uma série de características morfológicas, incluindo extensão do barbilhão nasal, posição do olho, extensão do primeiro raio da nadadeira peitoral, posição da nadadeira anal, posição do poro posterior do canal supra-orbital, forma do frontal, extensão da fontanela craniana, processo lateral do esfenótico, ausência da ossificação anterior do palatino, e tamanho do processo posterior do palatino e do osso supra-orbital.

Accepted by L. Page: 2 Jul. 2004; published: 9 Jul. 2004

Introduction

The Sarcoglanidinae (family Trichomycteridae) constitutes one of the most intriguing South American catfish assemblages. This group is known from a few specimens, which are classified at present into six genera and seven species (Costa, 1994; de Pinna, 1998; de Pinna & Winemiller, 2000). The scarcity of available specimens may be due to their very small size (usually less than 25 mm SL as adult), and their apparent preference for difficult to sample sandy banks of rivers and streams (Costa and Bockmann, 1994; Costa, 1994). Most sarcoglanidines are considered miniaturized fishes (Weitzman and Vari, 1988; Costa and Le Bail, 1999) and all except for one species are poorly pigmented, with translucent body in life. Two taxa, *Sarcoglanis simplex* Myers & Weitzman and *Malacoglanis gelatinosus* Myers & Weitzman possess an uncommon deep body, hypertrophied saclike adipose organ above pectoral fin, and absence of premaxillary teeth (Myers and Weitzman, 1966), and three taxa, *S. simplex*, *M. gelatinosus*, and *Stauroglanis gouldingi* de Pinna, have few or no opercular and interopercular odontodes (Myers and Weitzman, 1966; de Pinna, 1989; Costa, 1994). The three pairs of barbels found in other trichomycterids (maxillary, rictal and nasal barbels) are also present in sarcoglanidines, although nasal barbels are often shortened. In addition, some sarcoglanidine taxa have a pair of a barbel-like structures on the ventral surface of the head (Myers and Weitzman, 1966; Costa and Bockmann, 1994).

All species of five genera, *Sarcoglanis* Myers & Weitzman, *Malacoglanis* Myers & Weitzman, *Stauroglanis* de Pinna, *Stenolicmus* de Pinna & Starnes, and *Ammoglanis* Costa are endemic to the Amazon. In contrast, the other taxon, *Microcambeva barbata* Costa & Bockmann, is endemic to a small coastal basin of southeastern Brazil, the Rio São João drainage, in the Brazilian Atlantic forest area (Costa & Bockmann, 1994). The present paper reports the description of a new species of *Microcambeva*, the largest sarcoglanidine fish, known from the rio Ribeira do Iguape basin, southeastern Brazil, which is about 500 km, in a straight line, from the type locality of *M. barbata*.

Material and methods

Measurements and counts follow Costa (1992). Measurements are presented as percentages of standard length (SL), except for subunits of head, which are presented as percentages of head length. Counts of pelvic, pectoral and caudal fin-rays and vertebrae were made on cleared and counterstained specimens (C&S) prepared according to Taylor and Van Dyke (1985); in vertebrae counts, Weberian complex and compound caudal centrum are not included. Abbreviations for institutions are: DZSJRP, Universidade Estadual Paulista, São José do Rio Preto; MCP, Museu de Ciências da Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre; MNRJ, Museu Nacional, Universidade Federal do Rio de Janeiro; MZUSP, Museu de Zoologia da Universidade de São Paulo, São Paulo.

Microcambeva ribeirae **new species**
(Figs. 1-2)

Holotype. MZUSP 84301, 47.5 mm SL; Brazil: Estado de São Paulo: Município de Pedro de Toledo, Rio São Lourencinho, no Bairro São Lourenço; O. Oyakawa and party, 12 September 2001.

Paratypes. Brazil: Estado de São Paulo, Rio Ribeira do Iguape basin. MZUSP 78617, 5 ex., 41.3–48.1 mm SL; collected with holotype. - MZUSP 68169, 3 ex. (c&s), 37.7–41.8 mm SL; Ribeirão Poço Grande, under the bridge at the road SP-79, km 204, Município de Juquiá; O. Oyakawa and party, 11 March 2001. - MZUSP 74669, 10 ex., 33.5–46.2 mm SL; Rio Faú, Município de Miracatu; O. Oyakawa and party, 12 March 2001. - MZUSP 79953; 20 ex., 37.7–41.8 mm SL; Rio Espraiado, Estação Ecológica Juréia-Itatins, Município de Iguape; O. Oyakawa and party, 11 October 2002. - MNRJ 12314, 1 ex., 29.4 mm SL; MNRJ 14304, 4 ex. (1 c&s), 27.0–31.5 mm SL; MZUSP 49463, 1 ex. (c&s), 32.5 mm SL; Miracatu, Bairro do Furadinho, Ribeirão Areado, tributary of Rio São Lourencinho, Rio Juquiá drainage; C. R. S. F. Bizerril, 13 May 1995. - DZSJRP 2297, 1 ex., 42.1 mm SL; Fazenda Seara, Jacupiranga; L. M. T. F. Camargo and J. A. S. Zuanon, 23 August 1985.

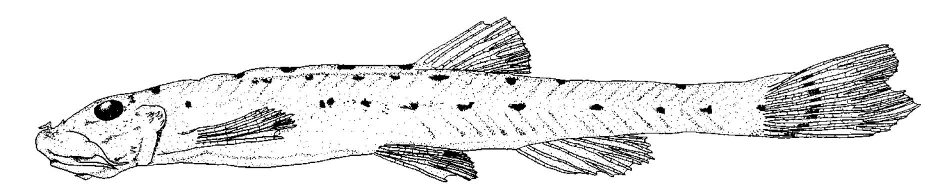


FIGURE 1. *Microcambeva ribeirae*, holotype, 47.5 mm SL, MZUSP 84301.

Diagnosis: Distinguished from *M. barbata* in having short nasal barbels which reach to just behind posterior nostril (*vs*. reaching posterior margin of eye); eye positioned on posterior half of head (vs. on central portion); first pectoral-fin ray shorter than posterior ones, its tip not forming a distinct filament (*vs*. first ray elongate, forming a prominent filament); anal fin origin posterior of vertical through base of last dorsal-fin ray (vs. at vertical through last dorsal-fin ray); posteriormost pore of each supraorbital canal united in the midline, composing a single median pore (*vs*. all supraorbital pores located laterally) (Fig. 3); frontal elongated anteriorly (*vs*. frontal not elongated) (Fig. 3); fontanel not extending anteriorly beyond posteriormost supraorbital pore (*vs*. fontanel extending anteriorly to a point close to anteromedial border of frontal) (Fig. 3); anterior portion of sphenotic with a prominent lateral process (*vs*. a short process) (Fig. 3); anterior palatine ossification absent (*vs*. present) (Fig. 4); posterior process of palatine elongate, about 60% of palatine bony portion without posterior process (*vs*. short, about 45% of that length) (Fig. 4); and supraorbital bone elongate, about three times as long as lacrimal (*vs*. approximately as long as lacrimal) (Fig. 4).

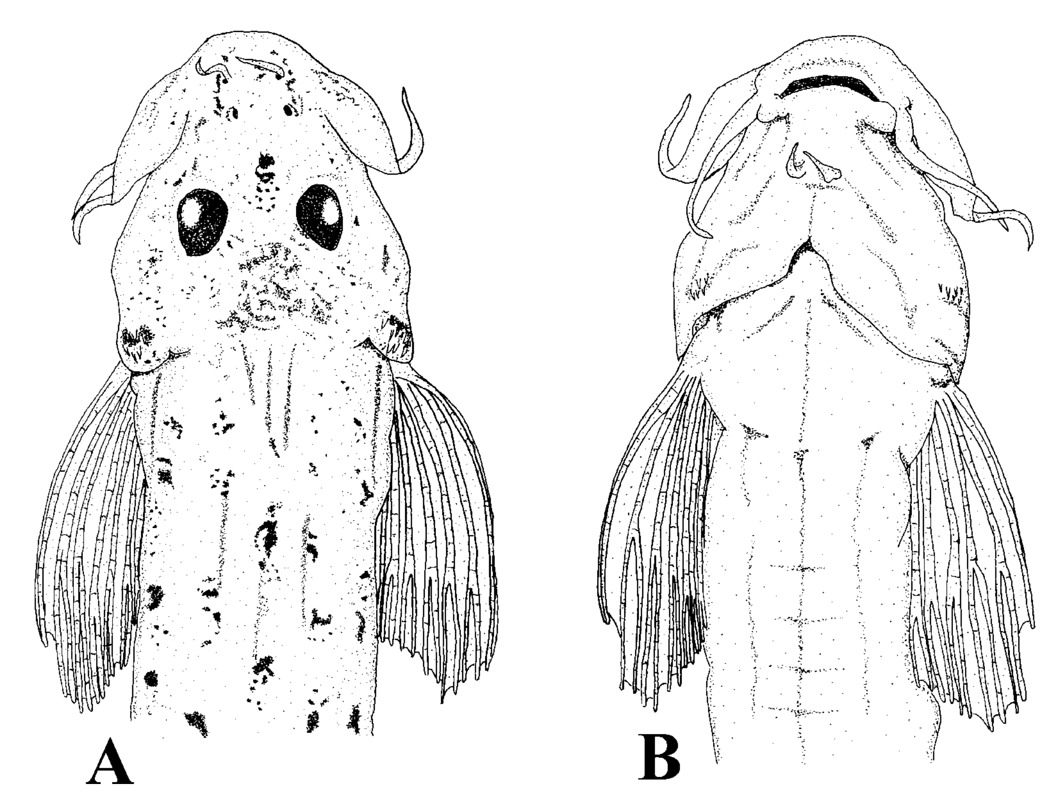


FIGURE 2. Dorsal (A) and ventral view (B) of the head and anterior portion of body of *Microcambeva ribeirae*, holotype.

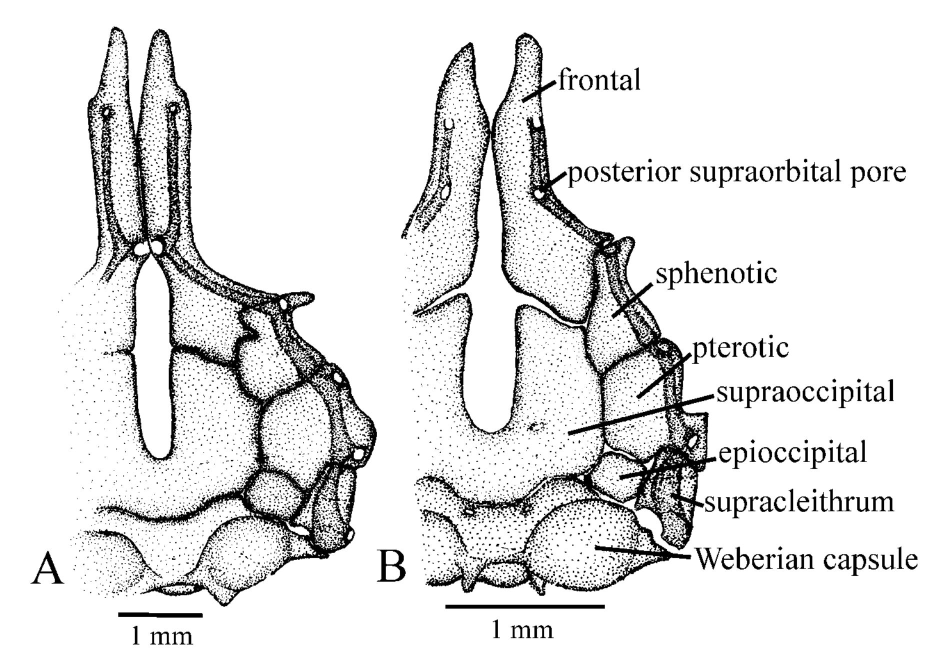


FIGURE 3. Dorsal view of the neurocranium of: A, *Microcambeva ribeirae*, B, *M. barbata*.

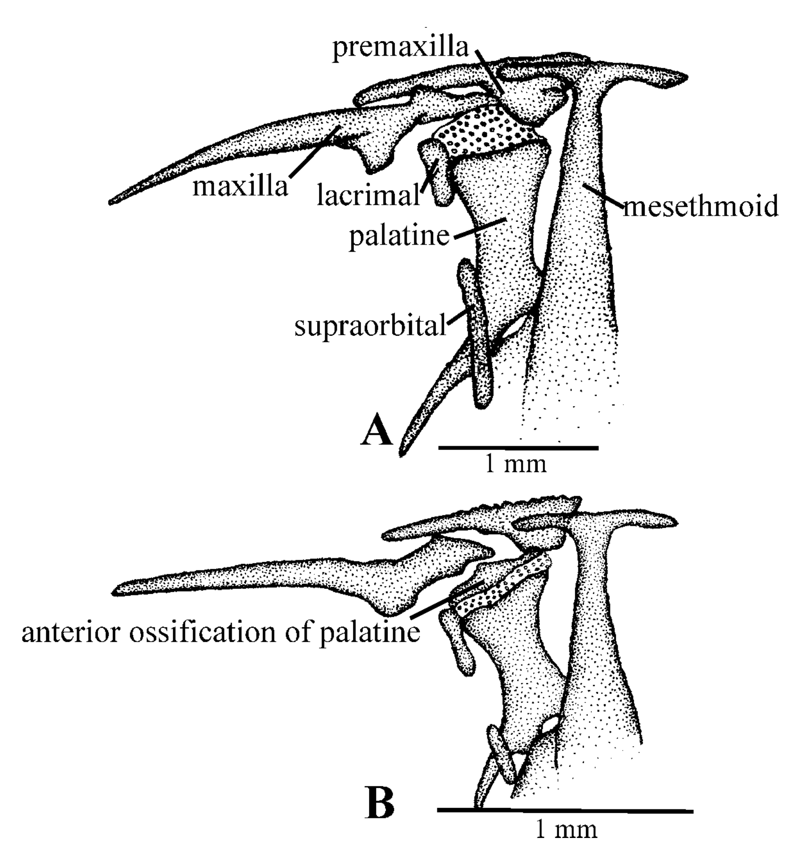


FIGURE 4. Dorsal view of the left upper jaw and associated structures of: A, *Microcambeva ribeirae*, B, *M. barbata*.

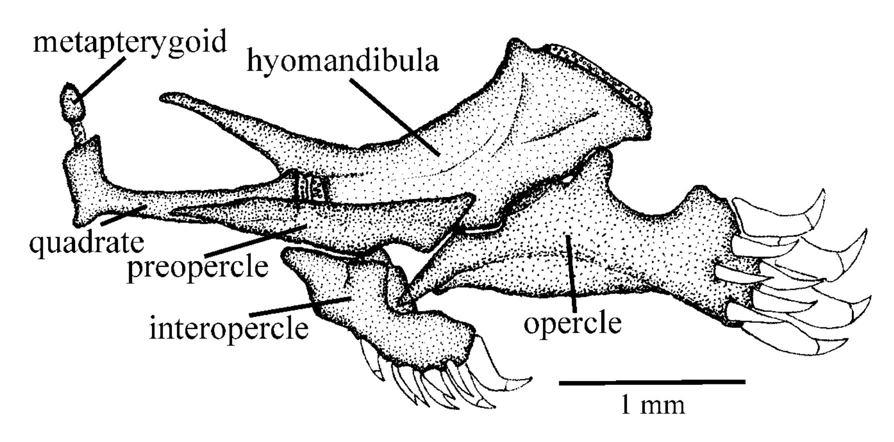


FIGURE 5. Lateral view of the right suspensorium and opercular apparatus of *Microcambeva ribeirae*.

Description: Morphometric data given in Table 1. Body elongate, approximately cylindrical anterior to pelvic-fin insertion, where it is slightly wider than deep, becoming gradually more compressed toward caudal-fin base; head moderately flattened, wider than deep. Dorsal profile slightly convex between snout and end of dorsal fin base, straight on caudal peduncle, slightly concave anterior to dorsal procurrent caudal-fin rays; ventral profile about straight along head, slightly convex along abdomen, gently concave between pelvic-fin insertion and anal-fin origin, and between this point and caudal-fin base. Greatest body depth at vertical just posterior to pectoral-fin base.

TABLE 1. Morphometric data of *Microcambeva ribeirae* n. sp. H: holotype.

	H	Paratypes								
	MZUSP 84301	MZUSP 78617	MZUSP 78617	MZUSP 74669	MZUSP 78617	MZUSP 78617	MZUSP 74669	MZUSP 74669	MZUSP 74669	MZUSP 74669
Standard length (mm)	47.5	48.1	46.4	46.2	44.0	41.3	37.8	37.1	36.9	36.4
Percents of standard length										
Body depth	12.6	13.5	13.9	11.5	12.3	13.4	12.3	13.4	11.5	11.8
Caudal peduncle depth	6.2	6.2	6.5	5.9	6.7	7.2	6.2	5.8	6.0	5.8
Body width	9.2	9.0	9.6	6.8	8.8	8.9	7.1	7.6	6.8	7.0
Caudal peduncle width	4.6	5.3	4.8	3.9	4.7	5.2	3.3	3.6	3.4	3.2
Dorsal-fin base length	10.5	9.8	9.9	11.2	10.5	11.0	11.2	11.5	9.1	9.2
Anal-fin base length	7.6	7.0	7.7	8.4	7.6	7.9	8.0	8.1	7.1	7.0
Pelvic-fin length	14.6	14.1	15.1	14.3	14.2	17.1	15.5	16.9	15.2	15.1
Distance between pelvic-fin bases	3.0	2.9	3.5	3.5	2.9	2.8	3.2	3.4	2.6	3.2
Pectoral-fin length	20.0	20.3	21.9	21.1	19.7	22.8	21.7	22.4	20.9	21.7
Predorsal length	51.8	52.3	53.4	53.4	50.6	50.8	52.6	51.9	52.1	51.8
Prepelvic length	45.0	44.9	47.1	48.0	45.0	44.8	47.7	46.8	46.8	46.0
Head length	18.6	18.4	18.8	18.8	19.1	19.7	21.1	21.5	19.6	19.7
Percents of head length										
Head depth	45.4	45.7	45.6	40.1	46.8	42.9	40.9	40.5	43.7	42.3
Head width	75.0	76.2	75.2	76.4	76.4	77.2	73.3	72.9	74.5	73.9
Interorbital width	14.8	14.9	14.5	14.5	13.8	13.6	14.5	13.3	13.5	13.7
Preorbital length	46.0	46.9	45.2	45.0	46.4	46.2	44.8	45.5	48.3	46.4
Eye diameter	19.1	21.0	19.8	19.9	20.2	20.7	19.8	19.2	19.4	19.7

Head depressed, longer than wide, subtriangular in dorsal view. Anterior profile of snout slightly rounded in dorsal view. Mouth subventral. Maxilla longer than premaxilla. Teeth conical, arranged in two irregular rows, on premaxilla and dentary; premaxilla with 12–15 teeth in outer row, 11–13 in inner row; dentary with 10–11 teeth in outer row, 6–10 in inner row. Eye approximately at posterior portion of head. Maxillary barbel moderate in length, tip reaching half distance between eye and opercular patch of odontodes, basal portion very broad; rictal barbel shorter than maxillary, tip reaching middle of eye; nasal barbel short, tip reaching just behind nostril. Pair of anteriorly directed barbel-like structures

on ventral surface of head, just anterior to branchiostegal region, approximately on midway between mouth and branchial aperture. Branchial membranes united to isthmus, branchial opening wide. Branchiostegal rays 6. Interopercular patch of odontodes short, with 6–8 conical odontodes; opercular patch of odontodes wider, with 9–14 conical odontodes (Fig. 5).

Dorsal fin subtriangular**,** origin at vertical through centrum of 14th or 15th vertebra. Anal fin rounded, origin at vertical posterior to dorsal-fin base, through centrum of 20th or 21st vertebra. Caudal fin emarginate. Pectoral fin subtriangular, lateral and posterior margins slightly convex; first pectoral-fin ray shorter than posterior ones, its tip not forming distinct filament. Pelvic fin about same length as pectoral fin, not reaching anal fin nor covering urogenital pore; pelvic-fin bases separated by small interspace; pelvic-fin base at vertical anterior to dorsal-fin base. Dorsal-fin rays 9 (ii, 6, i); anal-fin rays 8 (iii, 4, i); principal caudal-fin rays 13 (i, 10-11, i), dorsal procurrent rays 6–7, ventral procurrent rays 6–7; pectoral-fin rays 7 (i, 6); pelvic-fin rays 5 (i, 4).

Supraorbital canal with three pores; first pore in transverse line through anterior nostril, second pore in close proximity to posterior nostril, third pore fused into single pore in middle of head, in transverse line just posterior to orbit. Infraorbital canal with one pore, posterior to orbit. Preopercular canal with one pore, at vertical through anterior margin of opercular patch of odontodes. Lateral line of body short, with single pore at vertical just posterior to pectoral-fin base.

Frontal slender, portion anterior to second sensory pore elongate, longer than portion posterior to that pore; fontanel not anteriorly extending beyond posterior supraorbital pore (Fig. 3). Anterior portion of sphenotic with prominent lateral process (Fig. 3). Maxilla elongate, longer than total length of premaxilla; premaxilla with long and pointed lateral process; no anterior ossification on palatine; posterior process of palatine elongate, about 60% of palatine bony portion without posterior process; supraorbital elongate, about twice longer than lacrimal; anteromedian border on mesethmoid approximately straight (Fig. 4). Dorsal portion of quadrate narrow, without distinct posterior process; hyomandibula with narrow and pointed anterior process, anterodorsally directed (Fig. 5). Total vertebrae 34. Pleural ribs 5. Caudal skeleton consisting of two plates, triangular dorsal plate formed by fused parhypural and hypurals 3–5, and rectangular ventral plate formed by hypurals 1–2.

Coloration in alcohol: Side of body and dorsum pale yellow with longitudinal row of 9–13 dark brown spots along midline of flank, and two similar rows of spots on dorsolateral portion of body and dorsal midline, respectively. Venter white. Head pale yellow, with small dark brown spots on nape; dark chromatophores on center of dorsal surface of head just anterior to eye and base of nasal barbel. Melanophores concentrated on opercle and opercular patch of odontodes. Fins hyaline; faint gray stripe on dorsal fin and faint gray bar on caudal-fin base.

Coloration in life: Body almost translucent, with dark brown spots as described above. Golden iridescence around dark spots of lateral and dorsolateral rows of flank.

Distribution: Rio Ribeira do Iguape basin, southeastern Brazil.

Habitat notes: Collected in clear, shallow streams (about 60 cm deep), with a gray sandy bottom, in which some specimens were found entirely buried, except for snout and barbels (Bizerril, pers. obs.).

Etymology: From Ribeira, referring to the river basin (Ribeira do Iguape) in which the type locality of the new species is located.

Discussion

The geographic distribution of *M. ribeirae* represents the southernmost record for the Sarcoglanidinae. The previous record of *Microcambeva* for the Rio São João basin, Rio de Janeiro state, the present record for the Rio Ribeira do Iguape basin, São Paulo state, and two undescribed species of *Microcambeva* from the Rio Doce basin, Minas Gerais state, and Rio Jucuruçu basin, Bahia state, suggest that *Microcambeva* is widespread along coastal basins of southern, southeastern and eastern Brazil. This biogeographic pattern is similar to those patterns of some other freshwater fishes, including the characid genus *Rachoviscus* Myers (Weitzman and da Cruz, 1981), the rivulid annual fish genus *Leptolebias* Myers (Costa, 1995), and the loricariid genus *Otothyris* Myers (Garavello, Britski and Schaefer, 1998).

Microcambeva ribeirae is clearly more closely related to *M. barbata* than to any other currently described sarcoglanidine. Besides having a similar general morphology, both share an apomorphically rectangular ventral hypural plate, which was noted by Costa and Bockmann (1994) as diagnostic for the genus.

An anterior ossification on the anterior palatine cartilage occurs both in *M. barbata* (also present in the undescribed species of *Microcambeva* reported above) and in most other sarcoglanidines (de Pinna, 1989; de Pinna and Starnes, 1990; Costa and Bockmann, 1994), and is considered a synapomorphy for a clade that includes all sarcoglanidines except *Ammoglanis* (Costa, 1994). Therefore, the absence of that ossification in *M. ribeirae* may be interpreted as a reversal.

Like *M. barbata*, *M. ribeirae* possesses a pair of barbels on the ventral surface of the head, a condition otherwise only recorded for *Malacoglanis gelatinosus* and a single specimen of *Stenolicmus sarmientoi* (Myers & Weitzman, 1966; de Pinna *in* Costa, 1994). Unlike its only described congener, *M. ribeirae* has a median sensory pore on the dorsal surface of head, a condition otherwise found only in *Sarcoglanis simplex* and *Malacoglanis gelatinosus* among sarcoglanidines. The shared occurrence of both derived conditions would suggest a possible close relationship between *Microcambeva* and *Malacoglanis*, as already postulated by Costa & Bockmann (1994). However, all species of *Microcambeva* do not exhibit the synapomorphies of a clade including *Stauroglanis*, *Malacoglanis* and *Sarcoglanis*: reduced number of opercular odontodes (2–3, *vs.* 9–13 in *Microcambeva*),

reduced number of interopercular odontodes (0–4, *vs.* 6–8), anteromedian border on mesethmoid convex (*vs.* approximately straight), and widened dorsal process of quadrate (*vs.* attenuated) (de Pinna, 1989; Costa, 1994). However, only with basis on a detailed phylogenetic analysis involving all sarcoglanidines it would be possible to evaluate the distribution of these and other features to generate most parsimonious hypotheses, but this is beyond the scope of the present paper.

Acknowledgments

Thanks are due to O. Oyakawa and F. Langeani for the loan of specimens, and to F. Pupo for technical assistance in laboratory. A previous version of the manuscript benefited from the criticisms of G. Arratia, F. Langeani, and S. Schaefer. This study was supported by CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior), CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico - Ministério de Ciências e Tecnologia) , and FAPERJ (Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro). Collections by O. Oyakawa and party were funded by Projeto Biota/ Fapesp 00/04300-9, “Diversidade de peixes de riachos e cabeceiras da Bacia do Rio Ribeira de Iguape no Estado de São Paulo”.

References

Costa, W.J.E.M. (1992) Description de huit nouvelles espèces du genre *Trichomycterus* (Siluriformes: Trichomycteridae), du Brésil oriental. *Revue Française d'Aquariologie et Herpetologie*, 18, 101–110.

Costa, W.J.E.M. (1994) A new genus and species of Sarcoglanidinae (Siluriformes: Trichomycteridae) from the Araguaia basin, central Brazil, with notes on subfamilial phylogeny. *Ichthyological Exploration Freshwaters*, 5, 207–216.

Costa, W.J.E.M. (1995) *Pearl killifishes - the Cynolebiatinae: systematics and biogeography of a neotropical annual fish subfamily (Cyprinodontiformes: Rivulidae).* TFH, Neptune City, 128 pp.

Costa, W.J.E.M. & Bockmann, F.A. (1994) A new genus and species of Sarcoglanidinae (Siluriformes: Trichomycteridae) from southeastern Brazil, with a re-examination of subfamilial phylogeny. *Journal of Natural History*, 28, 715–730.

Costa, W.J.E.M. & Le Bail, P.-Y. (1999) *Fluviphylax palikur*: A new poeciliid from the rio Oiapoque basin, northern Brazil (Cyprinodontiformes: Cyprinodontoidei), with comments on miniaturization in *Fluviphylax* and other neotropical freshwater fishes. *Copeia*, 1999, 1027–1034.

Garavello, J.C., Britski, H.A. & Schaefer, S.A. (1998). Systematics of the genus *Otothyris* Myers 1927, with comments on geographic distribution (Siluriformes: Loricariidae: Hypoptopomatinae). *American Museum Novitates*, 3222, 1–19.

Myers, G.S., & Weitzman, S.H. (1966) Two remarkable new trichomycterid catfishes from the Amazon basin in Brazil and Colombia. *Journal of Zoology*, 149, 277–287.

de Pinna, M.C.C. (1989) A new sarcoglanidine catfish, phylogeny of its subfamily, and an appraisal

of the phyletic status of the Trichomycterinae (Teleostei, Trichomycteridae). *American Museum Novitates*, 2950, 1–39.

de Pinna, M.C.C. (1998) Phylogenetic relationships of neotropical Siluriformes (Teleostei: Ostariophysi): Historical overview and synthesis of hypothesis. *In:* L.R. Malabarba, Reis, R.E., Vari, R.P., Lucena, Z.M. & Lucena, C.A.S (eds) *Phylogeny and Classification of Neotropical Fishes*, Edipucrs, Porto Alegre, Pp 279–330.

de Pinna, M.C.C. & Starnes, W.C. (1990) A new genus and species of Sarcoglanidinae from the Rio Mamoré, Amazon Basin, with comments on subfamilial phylogeny (Teleostei, Trichomycteridae). *Journal of Zoology*, 222, 75–88.

de Pinna, M.C.C. & Winemiller, K.O.(2000) A new species of *Ammoglanis* (Siluriformes: Trichomycteridae) from Venezuela. *Ichthyological Exploration Freshwaters*, 11, 255–264.

Taylor, W.R., & Van Dyke, G.C. (1985) Revised procedures for staining and clearing small fishes and other vertebrates for bone and cartilage study. *Cybium*, 9, 107–109.

Weitzman, S.H. & da Cruz, C.A.G. (1981) The South American fish genus *Rachoviscus*, with a description of a new species (Teleostei: Characidae). *Proceedings of Biological Society of Washington*, 93, 997–1015.

Weitzman, S.H. & Vari R.P. (1988) Miniaturization in South American freshwater fishes: an overview and discussion. *Proceedings of Biological Society of Washington*, 100, 640–652.